C-AD

Radiation Safety Committee

Issued: Sept. 4, 2015

Minutes of BLIP RSC Target Review Subcommittee Aug. 13, 2015

Subject: Soil Caps over BLIP Transport and at BLIP

Present: D. Beavis, D. Raparia, S. Pontieri, R. Karol, R. Michnoff, C. Schaefer, M. Minty, B. van Kuik, P. Sampson, E.T. Lessard, C. Naylor, D. Paquette, H. Kahnhauser, C. Cutler, and A. Etkin

The committee was asked to review calculations on the required size of caps over the BLIP transport and around the BLIP target station with regards to the raster system and future intensity upgrades for BLIP operations.

D. Raparia provided[1] data on past and future operations to BLIP to be used in the analysis of the cap. The expected maximum routine beam losses were provided in this document. The analysis will use a very conservation value for operations of 240 micro-amps of beam for 230 days with the beam energy being all at 200 MeV. This is at least a factor of two above the present projections.

D. Raparia provided a power point file[2] to the Committee Chair providing details of the beam profile and beamline components including collimator locations. The beam profiles were provided for both 117 MeV and 200 MeV beam transport to BLIP. The profiles support the assertion of low routine beam losses for transport to BLIP. Losses at collimators are listed at 10^{-3} of the beam and other locations at 10^{-4} beam.

The RSC Chair conducted analysis of the soil activation and the analysis was presented in a power point presentation[3], which included substantial information provided by D. Raparia in footnote 2. The written report of that analysis was not complete at the time of the meeting but has since been completed and distributed[4]. The analysis assumed that the caps should be modified to accommodate 100% operations at 200 MeV for the future upgrade to 240 micro-amps for a total of 230 days. The main conclusions were:

- The BLIP-Y cap should be widened. It should be extended 14 feet to past the south outside wall of the tunnel
- The print showing the tunnel roof slope has the slope in the wrong direction and should have a note correcting this error.

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[1] D. Raparia, June 12, 1015

[2] D. Raparia, August 4, 2015

[3] D. Beavis, August 13, 2015

[4] D. Beavis, "Review of the BLIP Soil Caps", August 20, 2015; http://www.c-ad.bnl.gov/esfd/RSC/Memos/8_20_15_BLIP.pdf

- The main BLIP cap is sufficiently large.
- The notch where the south side BLIP cap comes to the asphalt pavement is close but does not need to have additional capping. At the time of the meeting it was thought that this area needed additional coverage, but an incorrect scale had been used in measurements. This small area is close to the distance where a cap would be required for the upgraded beam operations.
- The North side of the tunnel downstream of the pump house needs to has a cap added that extends 16 feet past the outside of the BLIP spur tunnel. This addition should also cover the HEBT tunnel until there is a 16 foot distance between the walls of the BLIP spur and the HEBT tunnel. The HEBT tunnel roof is sloped towards the BLIP spur so covering this portion of the HEBT tunnel prevents water from traveling on the HEFT tunnel roof to soil closer than 16 feet from the BLIP spur tunnel.
- Calculations conducted[5] by K. Yip and R. Seemungal provide independent verification of portions of the design.

The discussion during the meeting noted that the losses must be lower than the values used in the analysis. However, last year there was a vacuum leak that caused increased losses and one well is at 2.5 times the BNL action limit for tritium in the groundwater. Activation surveys of the beam line were high after the 2014 running. The vacuum leak was fixed after the run was over and the higher than expected residual radiation levels detected. After the RSC meeting the beam line was surveyed for the 2015 operations and the residual radiation levels have dropped substantially.

It was also noted that the losses in 2014 were not detected by the beam loss monitor system. For 2016 operations new loss monitors are being installed that will be more sensitive.

Recently a hot spot has appeared upstream of the BLIP-Y deflecting magnet. The Laser Profile Monitor (LPM) was a suspect but there was no understanding of how it could create elevated losses. After the meeting the beam line was inspected with an RCT. It appears that a few components downstream of the LPM appear to have an upward slope. They should be surveyed and adjusted as necessary to see if this is creating a loss point.

The upstream portion of the BLIP-Y cap was not changed but there should be a soil monitor placed to monitor this area. **(ATS-Linac-Van Essendelft & D. Beavis-Nov. 1, 2015)**

The final drawing of the cap shall be completed and a correction added for the reverse slope of the Linac tunnel roof. A copy should be given to D. Paquette to discuss with ES&H management. **(ATS-Linac-Pontieri & D. Beavis-Nov. 1, 2015)**

CC:

Present
RSC
RSC Minutes File
T. Blydenburgh
D. Passarello
M. van Essendelft

[5] K. Yip and R. Seemungal, August 17, 2015; http://www.c-ad.bnl.gov/esfd/RSC/Memos/blip_soil_kinyip.pdf